1999P03133 WO PCT/DE 00/00735

- 8 -

Patent claims

 A method for the automatic retrieval of engineering data from an automation system with a multiplicity of individual automation objects (RAO1..RAO4), in which method,

for the restoration of representatives (G1, G2, A01..A04) in an engineering system of objects (RG1, RG2, RA01..RA04) of the automation system,

the objects (RG1, RG2, RAO1..RAO4) supply an identifying designation of a type of their respective representative (G1, G2, AO1..AO4) to the engineering system,

the engineering system creates corresponding representatives (G1, G2, A01..A04) for the designated types and in the case of each of the representatites (G1, G2, A01..A04) reference to the object (RG1, RG2, RAO1..RAO4) and, by means of the reference, representative \(G1, G2, A01..A04) reads out engineering information from the object (RG1, RG2, RAO1..RAO4).

The method as claimed in claim 1, characterized in that, in a first step for the restoration of device representatives (G1, G2) in the engineering system, devices (RG1, RG2) on ' which the automation run \supply an identifying (RAO1..RAO4) objects designation of a type of their respective device representative (G1, G2) t **b** the engineering system,

the engineering system creates corresponding device representatives (G1, G2) for the

Printed:04-30-2001 AMENDED SHEET

10

15

20

30

25

10

15.

20

30

1999P03133 WO PCT/DE 00/00735

- 9 -

designated types and in the case of each of the device representatives (G1, G2) enters a reference to the device (RG1, RG2)

and, by means of the reference, each device representative (G1, G2) reads out engineering information from the device (RG1, RG2) and,

in a second step for the restoration of representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system,

the automation objects (RAO1..RAO4) supply an identifying designation (ESO type ID) of a type (ESO type) of their respective representative (AO1..AO4) to the engineering system,

the engineering system creates corresponding representatives (A01..A04) for the designated types and in the case of each of the representatives (A01..A04) enters a reference to the automation object (RA01..RA04)

and, by means of the reference, each representative (AO1..AO4) reads out engineering information from the automation object (RAO1..RAO4).

3. The method as claimed in claim 2, characterized in that, in a third step for the restoration of communication relationships between the representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system,

the devices (RG1, RG2) supply lists with communication relationships to the engineering system,

in the engineering system, entries of the lists are converted into references to inputs and

Printed:04-30-2001 AMENDED SHEET

1999P03133 WO PCT/DE 00/00735

- 10 -

outputs of the representatives (AO1..AO4) of the automation objects (RAO1..RAO4) and, subsequently, corresponding connections are set up in the engineering system.

5

The method as claimed in one of the preceding 4. claims, characterized in that both the objects of the engineering system (G1, G2, A01..A04) and the (RG1, RG2, RAO1..RAO4) of the automation system are described by a uniform, executable object model and a direct communication at model is possible between the objects of engineering system (G1, G2, A01..A04) and objects (RG1, RG2 λ RAO1..RAO4) of the automation system.

15

10

claim 5. The method as claimed in 3 orcharacterized in that entries in the lists with communication relationships contain sources drains of the communication relationships, 20 sources and drains in each case being described by a 3-tuple from an identifier of the device (RG1, identifier of the automation object an and an identifier of the input or (RAO1..RAO4) 25 output.

2,7

30

6. The method as claimed in one of the preceding claims, characterized in that the objects (RG1, RG2, RAO1..RAO4) of the automation system have no direct reference to the associated objects of the engineering system (G1, G2, AO1..AO4), to make it possible for the engineering system and automation system to be separated.

10

15

20

25

1999P03133 WO PCT/DE 00/00735

- 11 -

- 7. The method as claimed in one of the preceding claims, characterized in that the method is used for the updating of already existing engineering information as a delta method.
- 8. A system for the automatic retrieval of engineering data from an automation system with a multiplicity of individual automation objects (RAO1..RAO4), in which,

for the restoration of representatives (G1, G2, AO1..AO4) in \an engineering system of objects (RG1, RG2, RAO1 .. RAO4) of the automation system, the objects \RG1, RG2, RAO1..RAO4) contain an identifying designation of a type of their respective representative (G1, G2, AO1..AO4) for being supplied to the engineering system, engineering system contains means creating representatives (G1, G2, A01..A04) for the designated types and means for entering in the case of each of the representatives (G1, G2, A01..A04) a reference to the object (RG1, RG2, RAO1..RAO4), the reference being provided for the reading

out of engineering imprormation from the object (RG1, RG2, RAO1..RAO4) by each representative (G1, G2, AO1..AO4).

9. The system as claimed in claim 8, characterized in that, for the restoration of device representatives (G1, G2) in the engineering system, devices (RG1, RG2) on which the automation objects (RAO1..RAO4) run contain an identifying

Printed:04-30-2001 AMENDED SHEET

10

15

20

25

1999P03133 WO PCT/DE 00/00735

- 12 -

designation of a type of their respective device representative (G1, G2) for being supplied to the engineering system,

the engineering system contains means for creating device representatives (G1, G2) for the designated types and means for entering in the case of each of the device representatives (G1, G2) a reference to the device (RG1, RG2),

the reference being provided for the reading out of engineering information from the device (RG1, RG2) by each device representative (G1, G2) and in that, for the restoration of representatives (AO1..AO4) of the automation objects (RAO1..RAO4) in the engineering system,

the automation objects (RAO1..RAO4) contain an identifying designation (ESO type ID) of a type (ESO type) of their respective representative (AO1..AO4) for being supplied to the engineering system,

the engineering system contains means for creating representatives (AO1..AO4) for the designated types and means for entering in the case of each of the representatives (AO1..AO4) a reference to the automation object (RAO1..RAO4),

of engineering information from the automation object (RAO1..RAO4) by each representative (AO1..AO4).

10. The system as claimed in claim 9, characterized in that, for the restoration of communication relationships between the representatives (AO1..AO4) of the automation objects (RAO1..RAO4)

Printed:04-30-2001 AMENDED SHEET

10

15

20

1999P03133 WO PCT/DE 00/00735

- 13 -

in the engineering system, (RG1, RG2) contain lists devices \ the communication\relationships for being supplied to the engineering system and engineering system contains means for converting enthies of the lists into references inputs and \ outputs of the representatives (AO1..AO4) of the automation objects (RAO1..RAO4) the corresponding for \setting up means connections in the engineering system.

- 11. The system as claimed in one of claims 8 to 10, characterized in that both the objects of (G1, G2, A01..A04) and engineering system objects (RG1, RG2, RAO1.. RAO4) of the automation system are described \ by a uniform, executable object model and a dimect communication at model provided between the objects of the level is engineering system (G1, G2, AO1..AO4) and objects (RG1, RG2, RAO1..\ RAO4) of the automation system.
- ih claim 10 claimed 11, 12. The system as characterized in that entries in the lists with communication relationships dontain sources and 25 the communication \relationships, drains of sources and drains in each case being described by a 3-tuple from an identifier of the device (RG1, automation identifier of the an (RAO1..RAO4) and an identifier of \ the input or 30 output.
 - 13. The system as claimed in one of claims 8 to 12,

Printed:04-30-2001 AMENDED SHEET





04-25-2001

PCT/DE00/00735

CLMSPAMD

1999P03133 WO PCT/DE 00/00735

- 14 -

characterized in that the objects (RG1, RG2, RAO1..RAO4) of the automation system have no direct reference to the associated objects of the engineering system (G1, G2, AO1..AO4), to make it possible for the engineering system and automation system to be separated.

14. The system as claimed in one of claims 8 to 13, characterized in that the system is used for the updating of already existing engineering information.

10

5

AZ

Printed:04-30-2001

AMENDED SHEET